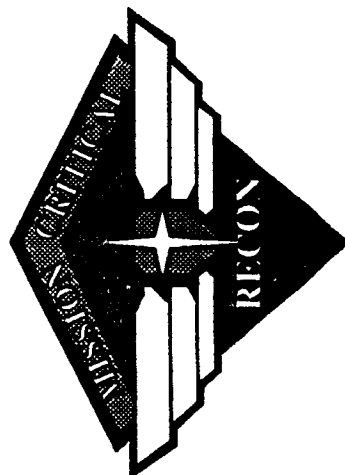


**RECONFIGURATION MANAGEMENT DIVISION  
SPACE STATION RECONFIGURATION OFFICE**



**Advanced Flight Software Reconfiguration**

**DP4/Bryan Porcher**

**8 August 1991**

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# **ADVANCED FLIGHT SOFTWARE** **RECONFIGURATION**

## **WHAT IS RECONFIGURATION?**

- **Identifying Mission and Configuration Specific Requirements**
- **Controlling Mission and Configuration Specific Data**
- **Binding this Information to the Flight Software Code to Perform Specific Missions**
- **Release and Distribution of the Flight Software**

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **WHAT IS THE PROBLEM?**

- **Space Station Freedom (SSF) Flight Software is Capable of Supporting Many Different Missions with Different Hardware Configurations and Payloads**
- **Mission Requirements, Payloads and Hardware Configurations will Change with Time**
- **Flight Software should be Designed to Incorporate Modifications while Minimizing Recoding**

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **TO ACCOMPLISH THIS GOAL**

- Specific Data about Missions, Payloads and Hardware Configuration will be Isolated from the Flight Software Code
- Details of the Missions and the Mission-Specific Configurations will be Contained in a Runtime Object Database (RODB), Telemetry Object Lists (TOLs) and Display Definition Files (DDFs)
- SSF Flight Software is being Developed using the Software Support Environment (SSE) to Provide Flexible and Cost-Effective Software Development in Addition to Configuration Control

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **OBJECTIVES**

- **Develop, Demonstrate and Validate Advanced Software Reconfiguration Tools and Techniques**
- **Demonstrate Reconfiguration Approaches on SSF Onboard Systems Displays**
- **Interactively Test Onboard System Displays, Flight Software and Flight Data**

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **OBJECTIVES (continued)**

- **Develop New Tools and Procedures for Developing and Testing Displays, Flight Software and Flight Data**
- **Validate SSE Tools for their Usefulness as Reconfiguration Tools**
- **Validate Existing Space Shuttle Reconfiguration Procedures for use with SSF**

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **BENEFITS**

- Avoids the "Pitfall" of the "If we can Build it Once, it will be Easier the Second Time" Mentality Which has Proven to be VERY Expensive
- Effectively Trains a Space Station Reconfiguration Team
- Increase in Software Quality and System Safety Due to the Development of More Effective Procedures

## **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

### **BENEFITS (continued)**

- **Possible Increase in Effectiveness of Space Shuttle Reconfiguration Due to the Adaptation of New SSF Reconfiguration Procedures**
- **Benefits All Users of Reconfigurable Products By Providing More Intensive Testing Before Product Release**
- **Potential Cost Avoidance of Existing Reconfiguration Infrastructure**



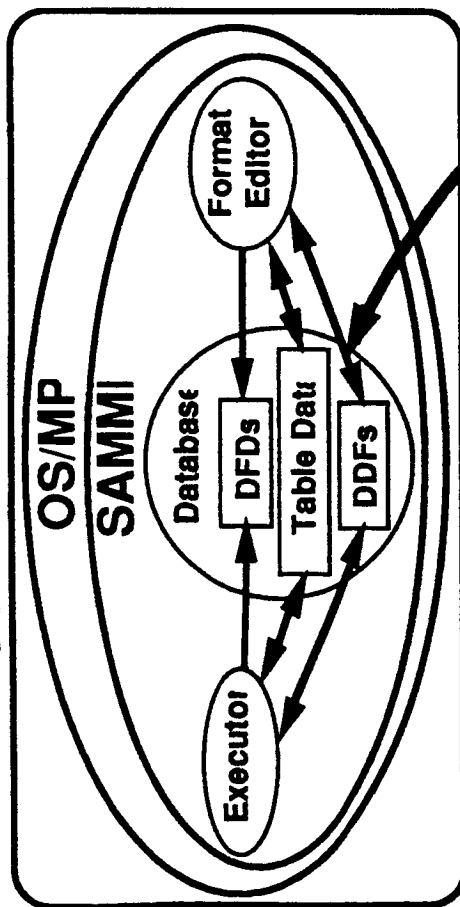
# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **TECHNICAL APPROACH**

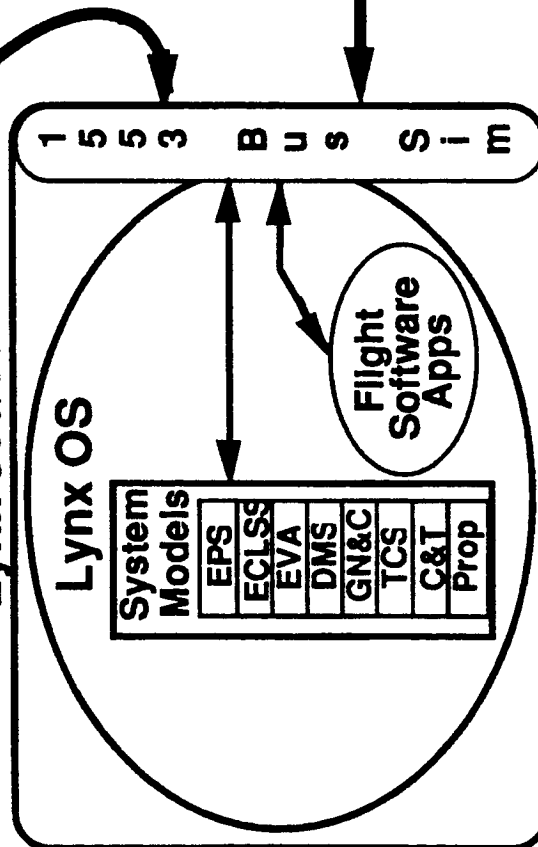
- Build a Small Test Environment
- Lynx 386/33 Mhz System Hosts the Simulated Onboard Data Management System (DMS)
- Solbourne S4000 System Hosts the Ground System Simulation
- Unisys 386SX/16 MHz System Simulates the Master Object Database (MODB), RODBs, Input/Output Databases (IODBs), TOLs

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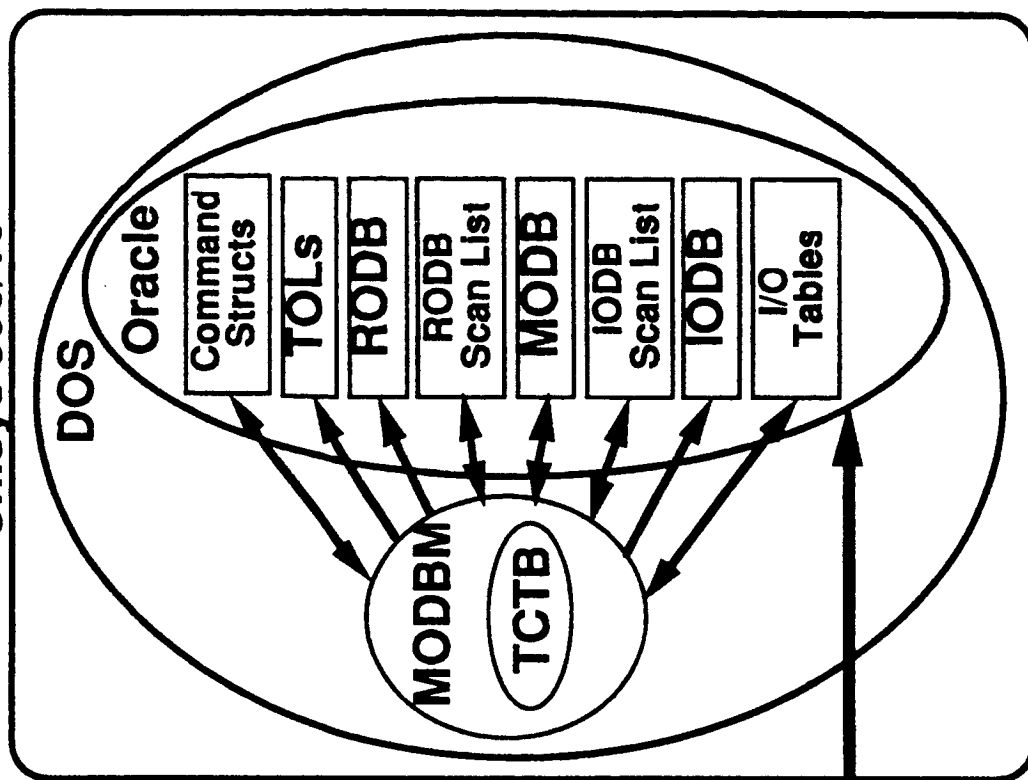
SOLBOURNE S4000



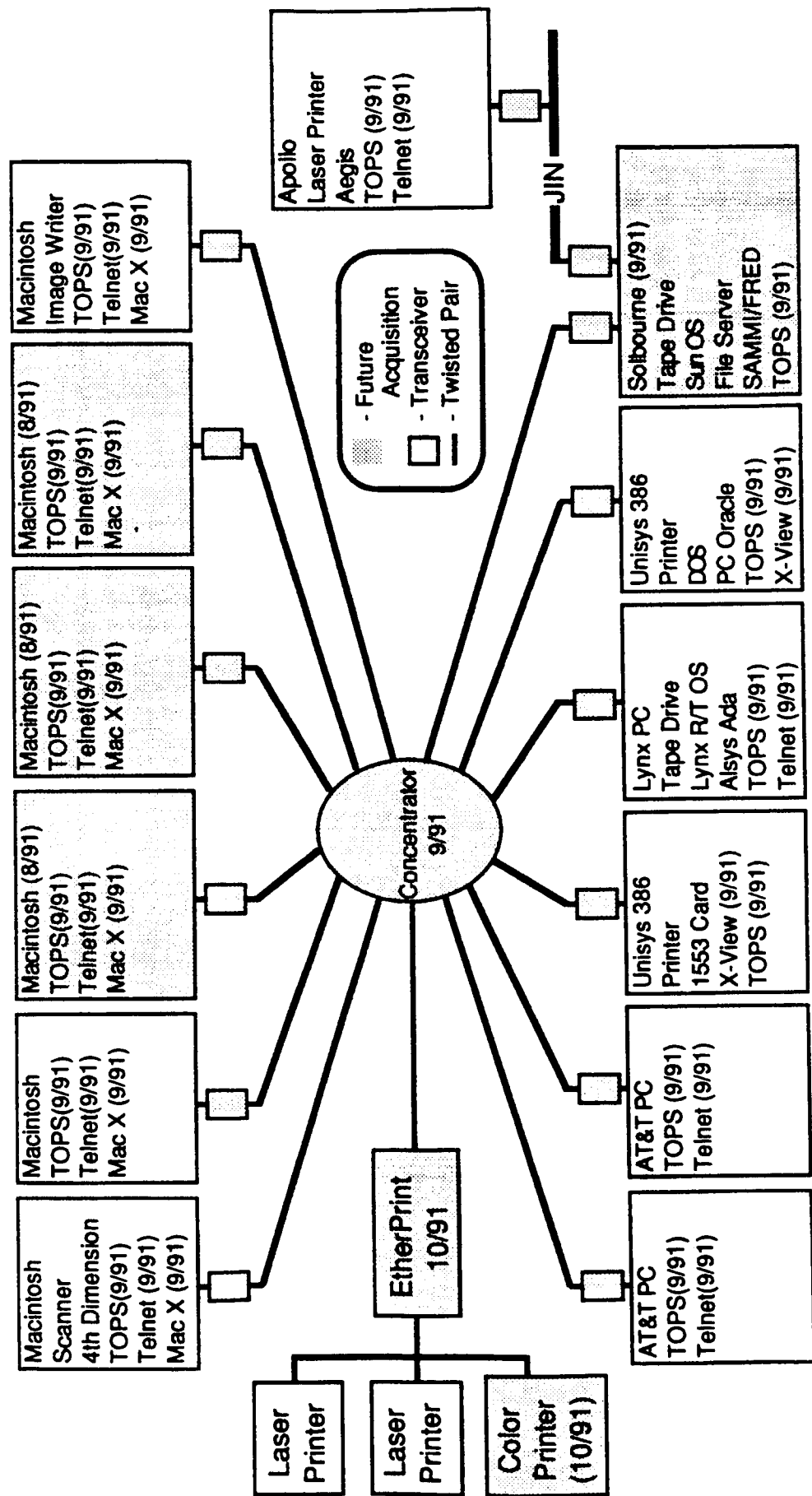
Lynx 386/33



Unisys 386/16



# ADVANCED FLIGHT SOFTWARE RECONFIGURATION



# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **BASELINE INTEGRATION**

- Data Management System (DMS) Upgrades are Available as Government Furnished Equipment (GFE) from Work Package 2 (WP-2)
- Software Developed by the Avionics Integration Environment (AIE) Project may be Reused
- Tools and Procedures Adapted for Space Shuttle Reconfiguration will be Integrated into the SPF on an Item-by-Item Basis

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **BASELINE INTEGRATION (continued)**

- The Advanced Flight Software Reconfiguration Network is Planned to be Connected to the SPF by July 1993
- Tools and Procedures Developed Under this Project will be Integrated into the Reconfiguration Software Production Facility (SPF) for SPF Support in January 1994

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **GROWTH AND EVOLUTION**

- Automated Mission Requirements, Flight Software and Display Product Generation
- Automated Product Verification and Validation

# **ADVANCED FLIGHT SOFTWARE RECONFIGURATION**

## **SUMMARY**

- **Allows Reconfiguration to be Designed into the SSF System**
- **Provides Valuable Hands-on Experience to the Space Station Reconfiguration Team**
- **Increases the Quality and Safety of the Space Station Freedom Program (SSFP) Due to the Development of More Effective Tools and Procedures**